REMARKS

I. REPLY TO REJECTION OF CLAIMS MADE UNDER 35 USC §102(e)

Claims 35, 36, 42, 43 and 44 have been rejected under 35 USC §102(e) as being anticipated by US Patent No. 6,647,649 to Hunt (hereinafter referred to as "the '649 patent" or "Hunt"). The Office Action alleges that:

> Hunt teaches a microparticle taggant having two or more distinguishable marker layers corresponding to a predetermined numeric code, namely a binary code (see abstract & col. 3, lines 14-20). The binary system comprises two bits, 0 and 1 (col. 4 lines 60-67).

Furthermore, Applicant reserves his right to challenge the assertion that the '649 patent is prior art. It is noted and emphasized that Hunt claims priority on two earlier filed applications, one filed December 3, 1999, and the other filed on December 4, 1998. It may be true that the written descriptions of one or more of the three related Hunt applications for patent do not support a conclusion that the '649 patent is prior art under 35 USC §102(e). Accordingly, Applicant's response herein is made on the basis of an assumption, *arguendo*, that Hunt is prior art.

It is well settled that to anticipate a claim under 35 USC §102 every element and limitation of the claimed invention must be found in a single prior art reference. *Karsten Mfg. Corp. v. Cleveland Golf Co.,* 242 F.3d 1376, 1383, 58 USPQ2d 1286, 1291 (Fed. Cir. 2001). Thus, Applicant will show, even assuming that Hunt is prior art, that the rejection is in error because not all claim elements and limitations are found in Hunt.

A. Reply to Rejection of Claims 35 and 36, 42, 43 and 44

Claim 35 and its dependent claim 36 require multiple pairs of chemicals in which the **presence** of one chemical of each pair represents a first bit value, and the **presence** of the other chemical represents a second bit value. The simplest case possible for the claimed method would be a binary process, using, for example, only a single pair of chemicals and only the bit values of "0" and "1." In such a method the presence of one of the chemicals, chemical "1A" would represent one of the bit values, "0" and the presence of the other chemical, chemical "1B," would represent the other bit value, "1."

The Hunt encoding method, however, is very different. It is described as using colored microparticles, and, assuming, *arguendo*, that its microparticles are be interpreted to be "chemicals" as claimed, Hunt represents bit values by the presence and **absence** of a particular microparticle. While the simplest encoding method of Hunt could also be a binary method, with one bit value being a "0" and the other bit value being a "1," the representation of the bit values in Hunt must be established by the presence and absence of the particular microparticle (chemical). This is in stark contrast to the claimed invention in which the bit values must be established by the presence of one or the other of the two chemicals.

Specifically, Hunt teaches that

> . . . the numeric code is a binary code having a predetermined number of places and having two values at each place, each microparticle set codes for one said value in a specific place in the code and the absence of said microparticle set in the taggant codes for the other said value at said specific place.

'649 patent at 3:14-20. Thus, whereas the claimed process requires the presence of each of the pair of chemicals in order for the process to work for its intended purpose, the Hunt process

requires either the presence or absence of a single chemical in order for the process to work for its intended purpose.

Furthermore, by associating the presence of each of a pair of chemicals with particular bit values in the claimed encoding process, additional functions and advantages are provided by the claimed invention as compared to the Hunt process. In the claimed method the presence of both chemical A and chemical B would indicate contamination, and the absence of both chemical A and chemical B would mean absence of the taggant, such as by destruction or absence for some other reason.

As may be understood from the above discussion, the coding method disclosed by Hunt is unreliable. The absence of a microparticle (chemical) prevents ruling out of certain errors or of the existence of other problems. Specifically, the apparent absence of a taggant microparticle set in a sample may be due to a failure to collect or observe any of the relevant microparticles rather than due to their actual absence in the tagged substance being sampled. This could result in the code of the Hunt method being read incorrectly. Additionally, if two tagged substances are combined prior to the analysis (either accidentally, or perhaps intentionally, in order to defeat the taggant system), then the analysis in the Hunt method would find a collection of taggant particles that would include particles from both tagged substances, and the code could again be read incorrectly. Thus, the inventions of claims 35-36, however, due to the required presence of one but not both of the chemicals, prevent these deficiencies of the Hunt process from occurring.

Also, the presently claimed inventions differ from Hunt in being generally applicable to various taggant materials, while Hunt is limited to particulate taggants. In the applicant's invention, the value of a given bit in a code is indicated by either the presence of one taggant material of a pair of taggant materials corresponding to the given bit, or the presence of the

second taggant material of the pair. With respect to the above example, the first bit of a code could be assigned a pair of chemicals, identified for convenience as chemical 1A and chemical 1B. Upon analysis, if chemical 1A is found, the bit would be assigned a value of zero. If chemical 1B is found the bit would be assigned a value of one. Thus, this claimed method provides for automatic error detection. Specifically, if neither chemical is found to be present, the observer knows that he has not succeeded in reading the taggant, and will not mistakenly assume that he has read a bit value of zero (as would be the case with the system of Hunt). Similarly, if both chemicals 1A and 1B are found to be present, then the observer knows that there has been contamination, and again is prevented from reading an incorrect code.

A comparison of how binary particulate taggants could provide coding in the two inventions highlights the differences in the inventions here. In the system of Hunt, the first bit would be assigned a single particle, for example, a two-layer particle with red and blue layers. If on analysis, this particle is not found, the bit is assumed to have a value of zero. If the particle is found, the bit is assumed to have a value of one. However, in this method, it is possible to read the code incorrectly if the sample is too dilute to collect a sufficient number of taggant microparticles. On the other hand, if two tagged products are combined, one of which has the red/blue particle, while the other does not, the presence of the sample that did not originally have the red/blue particle cannot be detected. This situation is exemplified by combining two samples with initial binary serial numbers of 1000101 and 1011001. This combination would produce a sample with an apparent binary serial number of 1011101, which does not match either of the initial samples.

In comparison and applying the coding method of claims 35-36 of the present invention to the above example further serves to highlight the differences between the claimed invention

and the Hunt invention. Instead of assigning only the red/blue particle to indicate both values of the first bit of the serial number, one could, for example assign the red/blue particle to indicate the value of one for the first bit, and a red/green particle to indicate the value of zero for the first bit. When the sample is analyzed, one would expect to find either the red/blue particle, or the red/green particle, but not both. If neither particle is found, the observer knows that he has not analyzed a sufficient quantity of the sample (or that the sample has not been coded). If both particles are found, the observer knows that the code has been corrupted. In either case, he is prevented from assuming he has correctly read an incorrect code or interpreted the absence of a code to be a code of a certain value. In the case of the two combined samples with serial numbers 1000101 and 1011001, the apparent serial number of the combined sample would b e 10***01, where the * indicates that the sample shows particles for both values of the bit. The observer would thus know that the code had been corrupted and would be prevented from reporting an incorrect value for the code.

For all of the above reasons it is believed that the rejection should be withdrawn.

B. Reply to Rejection of Claims 42, 43 and 44

Claims 42, 43 and 44 are directed to a binary taggant having a first chemical of a first chemical pair, a second chemical of the first chemical pair; a first chemical of a second chemical pair, a second chemical of the second chemical pair; and a first chemical of an additional chemical pair and a second chemical of the additional chemical pair, respectively. These claims are, like claims 35 and 36, directed to a binary coding system in which each of two chemicals in a pair provides for a positive bit value.

In these claims the bit values for the first place or 2^0 place (claim 42); for the second place or 2^1 place (claim 43); and for the third and any additional place or 2^2 place and higher orders of places (claim44) are represented by chemicals. As with the inventions of claims 35-36 each bit value is associated with the presence of a chemical, rather than with the absence of a chemical or other substance, such as a colored microparticle.

The same reasoning set forth above in reply to the rejection of claims 35-36 applies here to the rejection of claims 42-44, and is incorporated by reference herein. In contrast to Hunt, all of claims 35, 36, 42, 43 and 44 specifically address a binary coding system in which chemicals are used pair-wise to positively represent bit values and thereby to avoid the possibility of false readings.

II. REPLY TO REJECTION OF CLAIMS MADE UNDER 35 USC §102(b)

Claims 50, 51, 54 and 55 have been rejected under 35 USC §102(b) as being anticipated by US Patent No. 5,760,394 to Welle (hereinafter referred to as "the '394 patent" or "Welle"). The Office Action alleges that:

> Welle teaches a method of identifying and authenticating products wherein a first taggant and a second isotopic taggant are used in combination. See col. 2, lines 31-67. By this method a batch of products can be distinguished and identified.

As will be shown below, the above rejection is in error as a matter of law, fact and logic. Specifically, Applicant will show that the rejection is in error because not all claim elements and limitations are found in Welle, *Karsten, supra.*

Claims 50, 51, 54, and 55 are directed toward methods of encoding taggants to ensure that errors are not made in reading the taggants. In contrast the '394 patent discloses a taggant method and composition directed to identifying products.

Specifically, claim 50 requires two taggants: the first representative of identification information and the second representative of authentication information. Welle '394, at 2:27-67 does have two taggants (two stable isotopes of europium); but both of these taggants are representative of only identification information. Claim 51 further requires that the first and second taggants be selected from different groups of materials.

With respect to Well '394, an isotopic taggant is added to a product and this taggant can be easily observed at a later time to identify that product. Welle '394 also discloses a method of dealing with contamination by naturally occurring isotopes of the taggant chemical. Welle, however, does not address or describe in any way the possibility of sample contamination that could occur by combining multiple samples with different taggants. For example, consider a case of three batches of explosive tagged according to the method of Welle described at 2: 31-67, using europium isotopes Eu^{151} and Eu^{153}. Assuming the batches in question are batches 2, 4, and 6, according to Table II ('394 patent at 2: 48-59). Batch 2 is tagged at the ratio 25/75, batch 4 is tagged at the ratio 45/55, and batch 6 is tagged at the ratio 65/35. If one were to combine, either accidentally or deliberately, equal parts of batch 2 and batch 6, then a sample of this combined batch would have the taggant present at the concentration ratio 45/55, and would look like batch 4 if the taggant were read. An observer might incorrectly conclude that he had obtained a sample of batch 4. Thus, Welle '394 provides identification information, but does not provide information by which the observer can authenticate the correctness of the identification.

The present invention of claims 51, 52, 54 and 55 provide a coding method that avoids the above described deficiency found in the taggant system of Welle '394. In these claimed inventions two separate taggants are used. One taggant provides identifying information (such as, for example a taggant according to the coding method of Welle '394, or possibly according to

other coding methods), while the second taggant provides information to authenticate the first taggant. Thus, as claimed the two taggants are such that combining two samples that contain the taggants might produce an incorrect reading of the identifying information provided by the first taggant, and might produce incorrect authentication information provided by the second taggant. But the incorrect authentication information would not correspond correctly to the incorrect identifying information provided by the first taggant.

For example, in regard to claim 50, consider the first taggant formulated according to the method of Welle '394, and the second taggant being of a separate material, i.e., such that when two samples are combined, the first and second taggant could not provide valid taggant codes that could correctly correspond with one-another. The present application, in the paragraph spanning pages 14-15 provides an example and explanation of how such a method and taggant composition would operate for this intended purpose. In that example the identifying taggant for each of two batches of samples would be a pair of isotopic taggants of a first element, e.g., Eu, in different ratios. The authenticating taggant for each of two batches of samples would be a pair of isotopic taggants of a different element, e.g., Nd, in different ratios. Then, if the two samples were mixed (in equal amounts), the apparent identification ratio and the apparent authentication ratio would be their averages, respectively. However, as explained in detail in the specification, the probability that the resulting, apparent authentication ratio would be the correct authentication code for the resulting, apparent identification ratio would be so low as to be of no practical significance. Furthermore, in the event that the samples were mixed in unequal amounts, the probability of having an authentication code resulting from the mixture being a correct authentication code is even more remote.

For all of the above reasons it is believed that the rejection was in error and should be withdrawn.

III. ACKNOWLEDGEMENT OF ALLOWANCE OF CLAIMS 37, 48 AND 49

Allowance of claims 37, 48 and 49 is acknowledged.

IV. AUTHORIZATION TO CHARGE FEES

If any fees are due in regard to the present reply, authorization is hereby granted to charge Deposit Account 50-1215.

V. CONCLUSION

For all of the above reasons it is requested that the rejections be withdrawn and that a Notice of Allowance of all pending claims be forthcoming.

Respectfully submitted,

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